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Automated Accident Detection

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Abstract - Accidents are one of the leading causes of fatalities around the world. An important indicator of survival rates after an accident is the time between the accident and when emergency medical personnel are dispatched to the scene. We propose to develop an android application which will detect the occurrence of accident through android phone. The android phone has inbuilt sensors such as accelerometer, rotational sensors etc. whose values will be analyzed for accident detection. The application will be activated and perform its operations when the specified phone is said to cross the threshold range value in the application. Once accident is detected, the application will capture images from the front and rear camera of Android phone & GPS location will be recorded. This data will be combined in SMS and sent to pre-stored contacts which will inform authorities about accident. Thereby, this application will be very useful in our daily walks of life.

1 INTRODUCTION:

In the present world, driving a vehicle has to be done with at most care, otherwise it would result in accident and the reasons for the accident could be like negligent driving, emergency conditions, red light jumping. The main reason for a person's death during accident is the unavailability of the first aid provisions which is due to the delay in the information being reached to the hospital about the accident. The worst case to this problem is that the accident occurs when a person is travelling in a vehicle. So it is very difficult to track the accident and the whereabouts of the person as soon as it occurs. As a solution to this problem an on-board sensor of the mobile called Accelerometer which would help to detect even slight movement of an object, in our case the object being the mobile phone which is docked inside the car and which would not be held in hand or kept in pocket of the person who is driving the vehicle. This accelerometer with GPS receivers and other added components is a promising platform for constructing Accident detection systems which helps to reduce fatalities from car accidents by decreasing the response time of emergency responders and hence saving many valuable lives.

2 DESCRIPTION:

The modules in AUTOMATED ACCIDENT DETECTION are

User Interface and Mobile Shaking

1. Identify the location
2. Sending SMS
3. Capturing the image and sending Via Mail

The below Fig 1. Explains about the overall architecture of automated accident detection

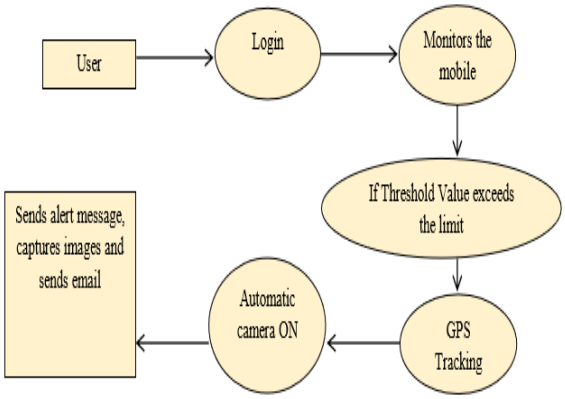

Fig 1. Architecture of automated accident detecting mechanism

2.1. USER INTERFACE AND MOBILE SHAKING

The user interface design is to be designed for providing the user a user-friendly environment. Fig 2.1 explains the user Interface module, the user has to give his/her details such as name, Email ID and emergency mobile numbers of their friends. In the apps settings, the user has to specify the threshold values. If they are alone they might set their threshold value to the lowest level. When the user is in danger, they should shake their mobile. Because of the lowest threshold level, the shaking capacity of the mobile also be lesser and the app starts to work automatically. If the user is in very safe situation, then the threshold value might set to

highest level. Fig a,b,c. shows the sample screenshots of the login page, registration and threshold.

Fig2.1: User Interface and Mobile Shaking

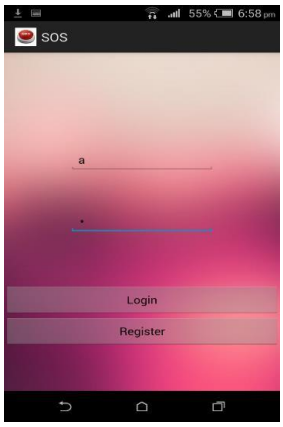

Fig a. Login

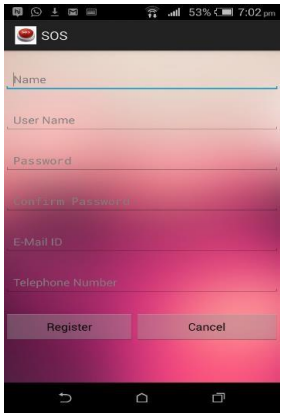

Fig b. Registration

Fig c. Threshold

2.2 IDENTIFY THE LOCATION

The Global Positioning System (GPS) is a space-based satellite navigation system that provides location and time information in all weather conditions, anywhere on or near the Earth where there is an unobstructed line of sight to four or more GPS satellites. The GPS in our smart phones always be in ON position only. When the mobile shakes, the app is switched ON and it prompts the GPS to track the user's location. The location of the user should be automatically identified by the GPS. The Latitude and Longitude values are calculated and it calculates the exact position of the user. The identified location is saved in the server. The app also finds the user's friends location through GPS. Fig 2.2 shows the identification of the current location.

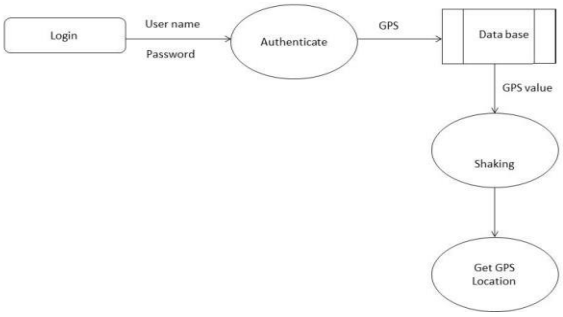

Fig2.2 Identifying the Location

2.3 SENDING SMS

In this module, based on the user's location the GPS calculates their latitude and longitude values. This app finds the user's friends contact and through GPS calculates the friend's location. All the values are stored in the server. The app compares the friends and the user's Latitude and Longitude values. If the values has reached nearer or same or less equal, the GPS finds the

location of the user's friends. In this app finds their friends location, which is nearer to the user using GPS. Then it sends the user's location as message alert to their friends who are nearer to the user. Fig 2.3 shows mechanisms of sending SMS to contacts whereas Fig d shows the screenshot image of emergency contacts.

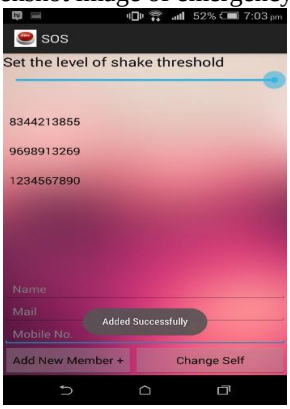

Fig d. displays the emergency contacts.

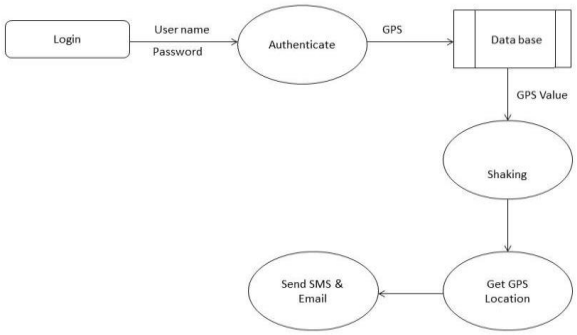

Fig 2.3 DFD for Sending SMS

2.4. CAPTURING IMAGE AND SENDING MAIL

In this module, the camera device in the user's mobile gets automatically switched on and captures the location as images. The captured image is then sent to the contacts who are nearer to the user through Email. Through this email, we can identify the victim and their current situation. This process will be done automatically once the resolution changes and the time out exceeds. This can be done with the help of the sensors used in the mobile phone. Normally every mobile have three types of sensors such as environmental sensor, rotation sensor and proximity sensors. We make use of rotation sensor mainly for this process, with the help of that the screen resolution is calculated and the above mentioned processes are done. Fig 2.4 shows flow chart for capturing image and sending mail to saved contacts.

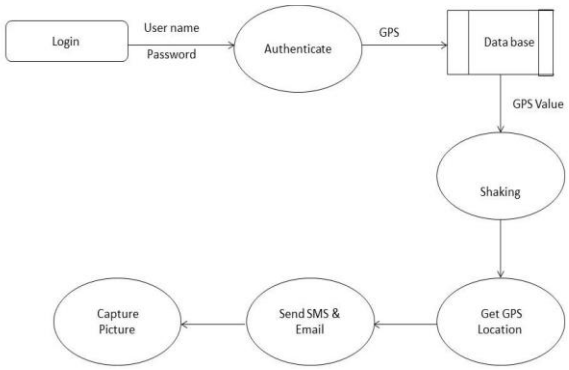

Fig2.4.Capturing Image and Sending Mail

Fig e. Application on process

Fig f. capturing the image

Fig e, f shows how the application starts and captures the image.

3. FALL DETECTION ALGORITHM

If the parameter > threshold value of the parameter
then
If > threshold value of (among 100 samples after satisfying the condition in Line 1)
Then
Return fall detection
Else
Return no fall detection

Fall detection algorithm, is a process or set of rules to be followed in the problem solving operation for automated accident detection mechanism. First the parameter that is noted by the application is compared with the threshold value and if it exceeds the threshold value set, then it confirms and returns a fall detection else it returns no fall detection. If it returns a fall detection then the application starts and it captures images and sends mail to the emergency contact list along with the current location.

4. CONCLUSION

Thus the android application for tracking mobile phones is created and installed in a mobile. This application works with the help of built in GPS in the mobile phones. When the user is met with an accident the mobile phone tracks the current longitude and latitude values, all the values are stored in the server. Then it sends the users location as a message alert to their friends and family members who are stored as emergency contacts in the user application. Android applications are written in java programming language. The mobile phone tracking is done with the help of GPS. Then the snapshots are sent as an email to the emergency friends contact list. Thus the receiver is aware of their friend's whereabouts, current location and about the incident that has taken place.

5. FUTURE ENHANCEMENT

There is a scope for improvement in this application and in future we can implement an additional enhancement of capturing videos which would provide driver`s assistance.

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